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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,519	06/20/2006	Ofer Snch	020008.0112PTUS	8637
24283 7590 06/24/2009 PATTON BOGGS LLP 1801 CALIFORNIA STREET SUITE 4900 DENVER, CO 80202				
EXAMINER				
CHEN, KEATH T				
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1792				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/563,519

**Applicant(s)**

SNEH, OFER

**Examiner**

KEATH T. CHEN

**Art Unit**

1792

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. The claim amendment filed on 05/06/2009, addressing claims 1-11 and 16 rejection from the non-final office action (01/06/2009), by amending claims 1, 4, 5, and 16 and cancelling claims 12-15 is acknowledged and will be addressed below.

### ***Election/Restrictions***

2. Applicant's cancellation of Claims 12-15 is acknowledge.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1, 3-5, 7-11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhatnagar et al. (US 6391146, hereafter '146), in view of Halsey et al. (US 6663025, hereafter '025), Heinze (US 2028603, hereafter '603), and Volgysi (US 20040163706, hereafter '706).**
4. '146 teaches the limitations of:
5. Claim 1: A sub-atmospheric downstream pressure control apparatus (Fig. 4, abatement system #200, col. 8, line 26, part of the system of Fig. 1, including the throttle valve #82), characterized by: a pressure control chamber (PCC) (exhaust tube #85, similar to exhaust tube shown in various figures in instant application) located in serial fluidic communication downstream from said first FRE; a gas source (one of the #235, col. 7, lines 37-40); and a flow controlling device (one of the mass flow controller MFC #240, col. 8, lines 6-7) in serial fluidic communication downstream from said gas

source and upstream from said PCC for controlling the PCC pressure to never exceed the pressure in said process chamber during normal operation (this is intended use, see discussion below).

6. Claim 5 (besides the limitations of claim 1): A wafer processing apparatus comprising a process chamber (Fig. 1, #25), said apparatus characterized by: a process reactive gas supply line (line connects between #70 and nozzle #72) from a process gas source (#70, col. 3, lines 36-38) in serial fluidic communication upstream from said process chamber; an upstream flow control device (the valve as shown in Fig. 1, not labeled) located in serial fluidic communication upstream from said process chamber and downstream from said process gas source.

7. Claim 16: A sub-atmospheric downstream pressure control apparatus (Fig. 4, abatement system #200, col. 8, line 26, part of the system of Fig. 1, including the throttle valve #82), comprising: (b) a pressure control chamber (PCC) (#210, gas energized reactor) located in serial fluidic communication downstream from said first FRE; (d) a gas source (one of the #235, col. 7, lines 37-40); (e) a flow controlling device (one of the control valve #240) in serial fluidic communication downstream from said gas source and upstream from said PCC for controlling the PCC pressure to never exceed the pressure in said process chamber during normal operation (this is intended use, see discussion below); (f) a reactive gas source (the second #235, col. 8, lines 12-13) connected in serial fluidic communication upstream from said PCC; and (g) an abatement element (#226a-b, electrode) located within said PCC.

8. Claims 4 and 8: A sub-atmospheric downstream pressure control apparatus as in claim 1 (or 5); said process chamber and said PCC (#85) are formed as compartments within a single process vessel (#200, #85, and wall of chamber #25 are connected into a single vessel).

9. Claim 9: A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is LPCVD (col. 12, line 35, col. 3, line 39, low pressure).

10. Claim 10: A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is RIE (col. 4, line 4 and col. 3, line 40, plasma etching is RIE).

11. Claim 11: A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is PECVD (col. 3, line 40).

12. For claims 1, 5, and 16, applicant's claim requirements "for controlling the PCC pressure to never exceed the pressure in said process chamber during normal operation", and for claims 9-11, applicant's claim requirements "LPCVD", "RIE", and "PECVD" are considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

13. '146 does not teaches the limitations of:

14. Claim 1: a first flow restricting element (FRE), wherein said first FRE is an immobile flow restricting element; a process chamber located in serial fluidic communication upstream from said first FRE; (a pressure control chamber PCC) located in serial fluidic communication downstream from said first FRE; a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element, said flow controlling device capable of responding with a millisecond response time.

15. Claim 5: a first flow restricting element (FRE) located in serial fluidic communication downstream from said process chamber, wherein said first FRE is an immobile flow restricting element; a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element, said flow controlling device capable of responding with a millisecond response time.

16. Claim 16: (a) a first flow restricting element (FRE) (throttle valve #82, Fig. 1) and a process chamber located in serial fluidic communication upstream from said first FRE, wherein said first FRE is an immobile flow restricting element; (c) a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element; (e) said flow controlling device capable of responding with a millisecond response time.

17. Claim 4: said first FRE is formed within the partition between said process chamber (#25) and said PCC (#85).

18. Claim 8: wherein a process chamber (Fig. 1, #25) is located in serial fluidic communication upstream from said first FRE, said first FRE is formed within the partition between said process chamber (#25) and said PCC (#85).

19. '025 is an analogous art in the field of manufacturing of semiconductor devices using plasma (field of the invention; similar to '146, col. 1, lines 53-56 and col. 3, line 13), particularly in rapid cycling of venting and pumping gas (col. 2, lines 39-41; similar to '146 effluent gas treatment, abstract). '025 teaches an immobile diffuser/flow restrictor (#200, Fig. 4A or 4B) at the bottom of the chamber (see Fig. 3A).

20. '603 is an analogous art in the field of turbo pump (title, right col. of page 2, line 40). '603 teaches a screen/flow restricting element (#44, Fig. 7, right col. of page 2, lines 65 to 75).

21. '706 is an analogous art in the field of gas flow control mechanism (title). '706 teaches a Voltage Controlled Orifice VCO that has milliseconds response time and has the additional advantage of lighter and cheaper ([0010]) than MFC.

22. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a diffuser/first immobile flow restrictor (first FRE), as taught by '025, to the bottom of chamber in Fig. 1 or 146, therefore, the process chamber is upstream from the first FRE and the FRE is upstream of Fig. 4 of '146, and "said first FRE is formed within the partition between said process chamber and said PCC". Furthermore, to have added a screen in front of pump (#125 of '146). This screen

would have been the second FRE. Still furthermore, to have replaced the MFC (#240) in Fig. 4 of '146 with a VCO of '706. Note the VCO is intrinsically capable of controlling the PCC pressure to never exceed the pressure in the process chamber, and it is a common knowledge to not to create backflow to avoid contamination to the process chamber.

23. The motivation to add an immobile diffuser/flow restrictor is to provide a rapid cycle in venting and pumping gas, as taught by '025 (col. 2, lines 39-41), and to reduce minute particle contamination (col. 3, lines 26-28). The motivation to add screen/second immobile FRE in front of pump is to remove particles, as taught by '603, (right col. of page 2, lines 72-75). The motivation to replace MFC with a VCO is for lighter and cheaper apparatus.

24. '146 further teaches the limitations of:

25. Claims 3 and 7: A sub-atmospheric downstream pressure control apparatus as in claim 1 (or 5) further characterized by: an abatement chamber (#210, gas energized reactor); a reactive gas source (the second #235, col. 8, lines 12-13) connected in serial fluidic communication upstream from said abatement chamber; and an abatement element (#226a-b, electrode) located within said abatement chamber.

26. '146 does not teach the limitations of:



27. Claim 3: A third FRE connected in serial fluidic communication downstream from said PCC (#85); an abatement chamber connected in serial fluidic communication upstream from said third FRE

28. Claim 7: A third FRE connected in serial fluidic communication downstream from said PCC (#85); an abatement chamber connected in serial fluidic communication upstream from said third FRE

29. '146 further teaches a throttle valve at the inlet #211 to prevent backflow (col. 6, lines 35-38). At the time the invention was made, it would have been obvious to a person of ordinary of skill in the art to have added an additional throttle valve between the outlet (#212, Fig. 4) and pumps (#125) to further prevent backflow of effluent (#100). This additional throttle valve would have been a third FRE downstream from said PCC(#85) and the abatement chamber (#210) upstream from said third FRE.

30. Motivation would have been to further prevent backflow of effluent, as taught by '146 (col. 6, lines 35-38).

31. '146 discloses the claimed invention except for an additional throttle valve. It would have been an obvious matter of design choice to duplicate the throttle valve, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

**32. Claims 1-2 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over '146, in view of '025 and '603 (note the mapping is different from the rejection above).**

33. '146 teaches the limitations of:

34. Claim 1: A sub-atmospheric downstream pressure control apparatus (Fig. 4, abatement system #200, col. 8, line 26, part of the system of Fig. 1, including the throttle valve #82), characterized by: a pressure control chamber (PCC) (#210, gas energized reactor) located in serial fluidic communication downstream from said first FRE; a gas source (one of the #235, col. 7, lines 37-40); and a flow controlling device (one of the control valve #240) in serial fluidic communication downstream from said gas source and upstream from said PCC.

35. Claim 5 (besides the limitations of claim 1 right above): A wafer processing apparatus comprising a process chamber (Fig. 1, #25), said apparatus characterized by; a process reactive gas supply line (line connects between #70 and nozzle #72) from a process gas source (#70, col. 3, lines 36-38) in serial fluidic communication upstream from said process chamber; an upstream flow control device (the valve as shown in Fig. 1, not labeled) located in serial fluidic communication upstream from said process chamber and downstream from said process gas source.

36. Claims 2 and 6: A sub-atmospheric downstream pressure control apparatus as in claim 1 (or 5) further characterized by: a reactive gas source (the second #235, col. 8, lines 12-13) connected in serial fluidic communication upstream from said PCC; and an

abatement element (#226a-b, electrode) located within said PCC.

37. '146 does not teaches the limitations of:

38. Claim 1: a first flow restricting element (FRE), wherein said first FRE is an immobile flow restricting element; a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element.

39. Claim 5: a first flow restricting element (FRE) located in serial fluidic communication downstream from said process chamber, wherein said first FRE is an immobile flow restricting element; a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element.

40. '025 is an analogous art in the field of manufacturing of semiconductor devices using plasma (field of the invention; similar to '146, col. 1, lines 53-56 and col. 3, line 13), particularly in rapid cycling of venting and pumping gas (col. 2, lines 39-41; similar to '146 effluent gas treatment, abstract). '025 teaches an immobile diffuser/flow restrictor (#200, Fig. 4A or 4B) at the bottom of the chamber (see Fig. 3A).

41. '603 is an analogous art in the field of turbo pump (title, right col. of page 2, line 40). '603 teaches a screen/flow restricting element (#44, Fig. 7, right col. of page 2, lines 65 to 75).

42. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a diffuser/first immobile flow restrictor, as taught by '025, to the bottom of chamber in Fig. 1 or 146, or upstream of Fig. 4 of '146. This diffuser/immobile flow restrictor would have been the first FRE. Furthermore, to have added a screen in front of pump (#125 of '146). This screen would have been the second FRE.

43. The motivation to add an immobile diffuser/flow restrictor is to provide a rapid cycle in venting and pumping gas, as taught by '025 (col. 2, lines 39-41), and to reduce minute particle contamination (col. 3, lines 26-28). The motivation to add screen/second immobile FRE in front of pump is to remove particles, as taught by '603, (right col. of page 2, lines 72-75).

### ***Response to Arguments***

44. Applicant's arguments filed on 05/06/2009 have been fully considered but they are unconvincing in light of the new ground of rejection above.

45. Applicant argues that the examiner takes broader interpretation of FRE than is supported in the specification, and FRE is a specific known device as shown at 416 in Fig. 4A of '025 patent, see the fourth paragraph of page 6.

This argument is found not persuasive.

The examiner is counting o 416 of '025 in the above rejection.

The examiner maintains the broadest reasonable interpretation in light of the specification is applied (See MPEP 2111). The Specification did not limitation the FRE

to the devices shown in the Figures nor referred to 416 in Fig. 4A '025 as the only FRE. On the other hand, the last paragraph of the Specification clearly indicates that the scope of the invention is not limited by the examples.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30AM-3 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./  
Examiner, Art Unit 1792  
/Ram N Kackar/  
Primary Examiner, Art Unit 1792